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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,355	04/12/2004	Robert Martinson	NOVE100042000/NVLS-2898	4719

83686 7590 08/31/2010

Novellus Systems, Inc
Attention: Suki Brar
4000 North First Street
San Jose, CA 95134

EXAMINER	
BAND, MICHAEL A	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
08/31/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/823,355	MARTINSON ET AL.	
	Examiner	Art Unit	
	MICHAEL BAND	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 July 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 20-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 20-37* is/are rejected.

7)☒ Claim(s) *1,20 and 25-28* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 July 2010* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/19/2010 has been entered.

Claim Objections

2. Claims 1, 20, and 25-28 are objected to for having the incorrect status identifiers. Claims 1 and 20 should be identified as 'Currently Amended' or have a similar identifier and claims 25-28 should be identified as 'New', not 'Previously Presented'.

Claim Rejections - 35 USC § 103

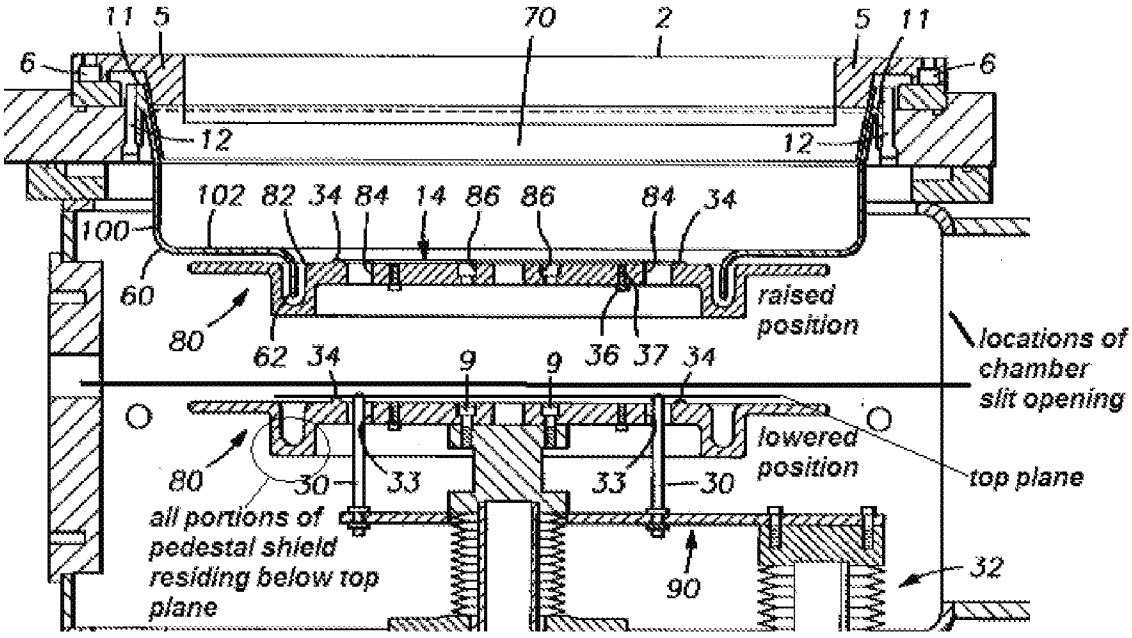
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1 and 20-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tepman et al (US Patent No. 5,589,224; i.e. Ref1) in view of Tepman et al (US Patent No. 5,803,977; i.e. Ref2) and Chung et al (US Patent No. 6,171,453).

With respect to claims 1, 20, 29-33, and 37, Ref1 discloses an apparatus for full wafer deposition with a shield arrangement that prevents deposition in the area of a chamber surrounding a substrate (i.e. wafer) (abstract). Ref1 further discloses in fig. 2 the chamber [2] comprises lower, side, and upper walls, a lifter apparatus [90] for moving a pedestal [80] between a lower unloading position and a raised deposition position, and a sputter target [70] above said pedestal [80]. Fig. 5 further depicts the pedestal [80] having an extended segment (i.e. pedestal shield) [82] that is movable between the raised position and lowered position and has all portions that entirely reside below a top plane of bumps [34] of said pedestal [80] and said extended segment [82] for centering the substrate (col. 3, lines 43-48; col. 6, lines 47-48), with said extended segment [82] having an outwardly and downwardly extending portion surrounding and extending from said pedestal [80] toward the chamber [2] lower walls and an outwardly and upwardly curving end extending toward said chamber [2] side walls. Fig. 5 also depicts a sidewall shield [60] comprises a cylindrical portion [100] that extends around and within the chamber sidewalls along with downward from an upper portion, said sidewall shield [60] extending in a curved inwardly and downwardly extending pattern with a lower end [62] disposed below an upper surface plane of the pedestal [80] and adjacent to the upper portion of the pedestal shield [82]

when said pedestal [80] is raised. Fig. 5 further depicts that the lower end [62] is above the pedestal [80] when said pedestal [80] is in the lowered position a distance sufficient to permit a wafer (i.e. substrate) to be horizontally loaded onto said pedestal [80] via slit valve-controlled opening in chamber wall (col. 5, lines 20-49), with said pedestal shield [82] and said sidewall shield [100] cooperating when the pedestal [80] is in the raised position to avoid contact with each other and prevent line of sight deposition from the sputter target [70] to the side and lower walls of the chamber [2]. Ref1 also discloses the shield [60] and the pedestal [80] are configured to be easily removed from the chamber [2] (col. 6, lines 16-19). The cropped figure below of fig. 5 serves to further clarify the top plane, the raised position, the lowered position, and a robot blade for horizontally transporting the wafer (i.e. substrate) into and out of the chamber [2] without interference from the pedestal shield [82].



However Ref1 is limited in that it is unclear as to whether the bump, and thus the top plane, is part of the pedestal or the pedestal shield.

Ref2 teaches a removable deposition shield assembly for a sputtering chamber (abstract), where figs. 1-2 depict a substrate [14] on a pedestal [16] having bumps [35] with a top plane, a cylindrical shield [10], and a shield ring (i.e. pedestal shield) [20], where figs. 5-6 alternatively depict said bumps may or may not be part of a deposition ring (i.e. pedestal shield) instead of said pedestal. Ref2 teaches that both locations of the bumps function identically to precisely center the substrate (col. 3, lines 63-67; col. 4, line 1; col. 6, lines 11-13; col. 7, lines 46-51).

Since Ref2 recognizes the equivalency of forming the bumps as part of the pedestal or pedestal shield to center the substrate, it would have been obvious to one of ordinary skill in the art to form the bumps of Ref1 as part of the pedestal taught by Ref2 as it is merely the selection of functionally equivalent bump locations recognized in the art and one of ordinary skill would have a reasonable expectation of success in doing so. It further would have been obvious that since both Ref1 and Ref2 teach bump locations for centering the substrate, one of ordinary skill would substitute one bump location (i.e. pedestal shield) for another (i.e. pedestal) to attain the predictable result of centering the substrate. It further would have been obvious to one of ordinary skill in the art to try using the bump location on the pedestal of Ref2 in attempt to improve the centering of the substrate of Ref1, as a person with ordinary skill has good

reason to pursue the known options within his or her technical grasp since the bump is located on either the pedestal or pedestal shield.

However Ref1 is further limited in that while it is suggested to configure a removably attachable pedestal, the pedestal shield being removably attachable to the pedestal is not suggested.

Chung et al further teaches a sidewall shield [48] used for physical vapor deposition with a pedestal [82] having a pedestal shield [84] capable of moving up and down inside a deposition chamber [80] (abstract; figs. 6A-6B). Figs. 6A-6B depict the sidewall shield [48] having an extension to a lower end that extends below the pedestal [82] and forms a bottom wall shield (i.e. inward portion) that extends along a lower wall of the deposition chamber [80], with said bottom wall shield extending upward with a lower portion of the pedestal shield [84] between said extension and said bottom wall shield. Chung et al also teaches the pedestal shield [84] being attachable to the pedestal [82] (col. 6, lines 59-64).

It would have been obvious to one of ordinary skill in the to substitute the two-piece pedestal shield and pedestal as taught by Chung et al in place the single-piece pedestal shield and pedestal of Ref1 to attain the predictable result of blocking line-of-sight to prevent deposition particles from depositing on the chamber sidewalls and bottom. It further would have been obvious to one of ordinary skill in the art to have the pedestal shield attachable (i.e. removable) to the pedestal since it has been held that if it were desirable for any reason to obtain access to the pedestal, it would be obvious to make the pedestal shield removable for that purpose. See MPEP 2144.04, Section V, Part C. In this case,

it is desirable to remove only the pedestal shield in order to replace or clean said pedestal shield due to deposited material while leaving the pedestal in place, thus it is obvious to make said pedestal shield removable. It further would have been obvious to one of ordinary skill in the art to use the two-piece pedestal shield and pedestal taught by Chung et al to prevent deposition particles from depositing on the chamber sidewalls and bottom as taught by Ref1 since using a known technique of pedestal shields for preventing deposition material accumulating on the chamber sidewalls and bottom is desired in Ref1. It further would have been obvious to one of ordinary skill in the art to try using the two-piece arrangement of Chung et al in attempt to improve the single-piece arrangement of Ref1, as a person with ordinary skill has good reason to pursue the known options within his or her technical grasp since the pedestal shield is either permanently attached to the pedestal (i.e. single-piece) or removable (i.e. two-piece).

With respect to claims 21-28 and 34-36, Ref2 further teaches a removable deposition shield assembly [550] for a sputtering chamber, where said deposition shield assembly [550] comprises a removable shield ring [20] resting and secured directly on a removable deposition (i.e. pedestal isolator) ring [522] where said deposition ring [522] is attached to a pedestal [504] (abstract; fig. 6). Ref2 further teaches that “in essence, the deposition ring [522] is a removable extension [i.e. end portion] of [a] support surface of the pedestal [504]” (col. 6, lines 8-9). Ref2 cites the advantage of using the deposition ring as preventing deposition on the chamber and hardware outside the processing region and

facilitating replacement of the deposition ring due to built-up deposition material (abstract; col. 7, lines 28-35).

The combination of the reference Chung et al teaching a removable pedestal shield attached to an end portion of a pedestal via a mechanical connection with the reference Ref2 teaching a removable pedestal shield resting and secured on a deposition ring on an end portion of a pedestal yields a removable pedestal shield removable attached and secured to an end portion that is a deposition (i.e. pedestal isolating) ring via a mechanical connection.

Response to Arguments

Drawings

5. The new Drawings filed 7/19/2010 are accepted and replace the old Drawings filed 4/12/2004.

Double Patenting

6. The Applicant filed a Terminal Disclaimer on 4/21/2010, with said Terminal Disclaimer approved on 4/26/2010; the rejection is withdrawn.

103 Rejections

7. Applicant's arguments with respect to claims 1 and 20-37 have been considered but are moot in view of the new ground(s) of rejection due to the new claim limitation requiring all or the entire pedestal shield to reside below a top plane of the pedestal.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 9am-5pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795